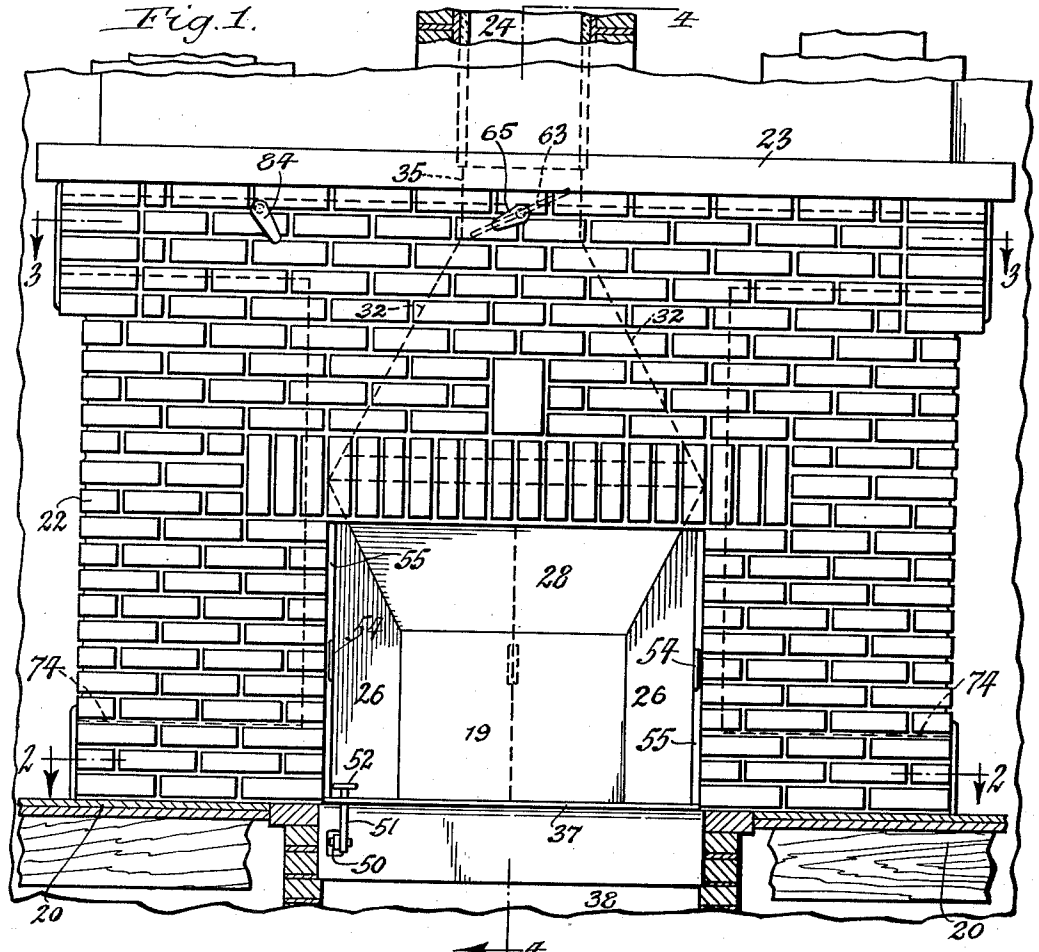
Dec. 3, 1940. M. L. HEINZ 2,223,763

FIREPLACE CONSTRUCTION

Filed Nov. 14, 1939 3 Sheets-Sheet 1

Fig. 1.



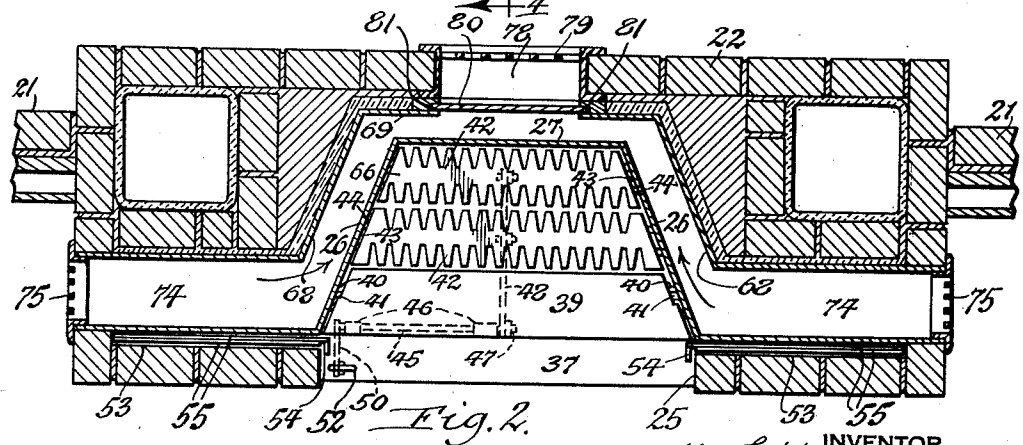


Fig. 2.

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Dec. 3, 1940. M. L. HEINZ 2,223,763

FIREPLACE CONSTRUCTION

Filed Nov. 14, 1939 3 Sheets-Sheet 2

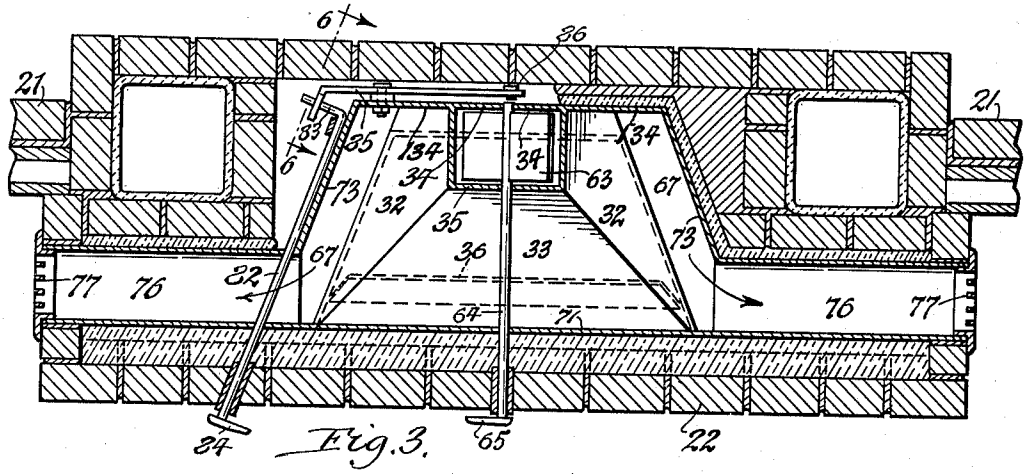


Fig. 3.

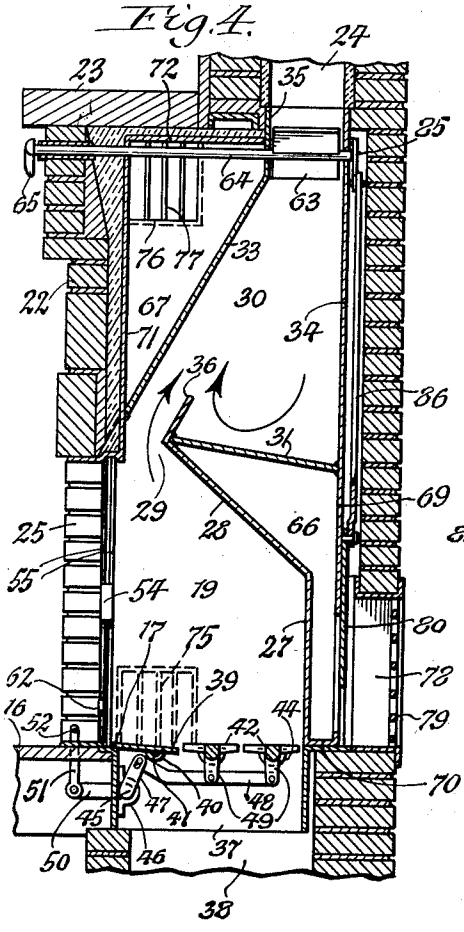


Fig. 4.

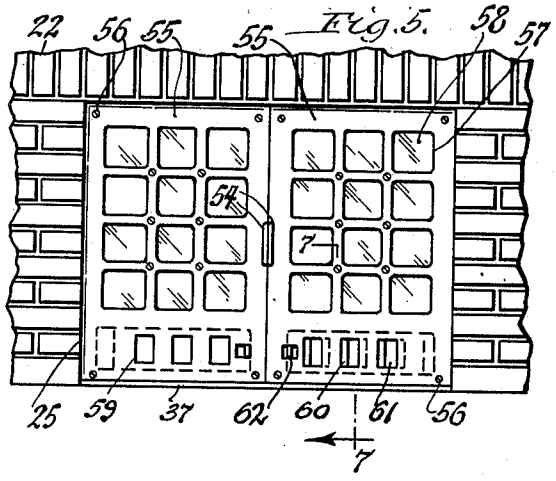


Fig. 5.

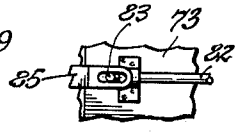


Fig. 6.

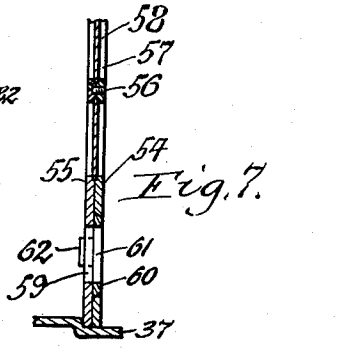


Fig. 7.

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FIREPLACE CONSTRUCTION

Filed Nov. 14, 1939 3 Sheets-Sheet 3

Fig. 8.

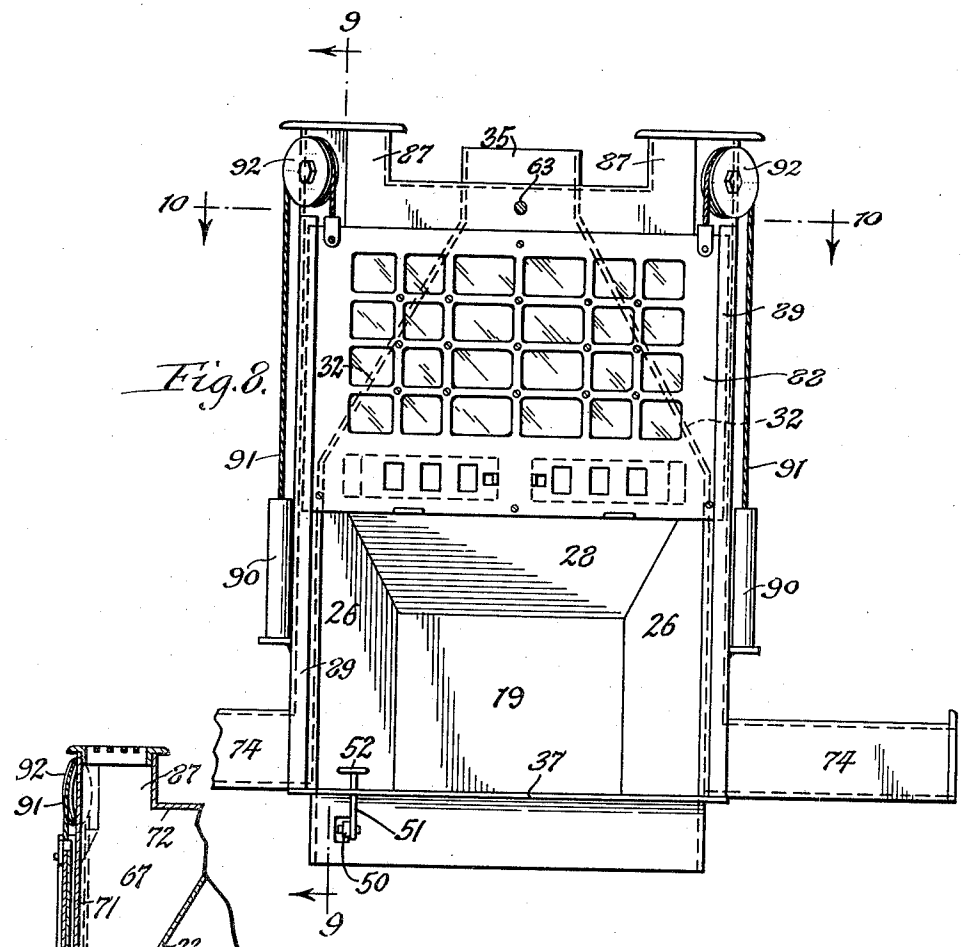


Fig. 9.

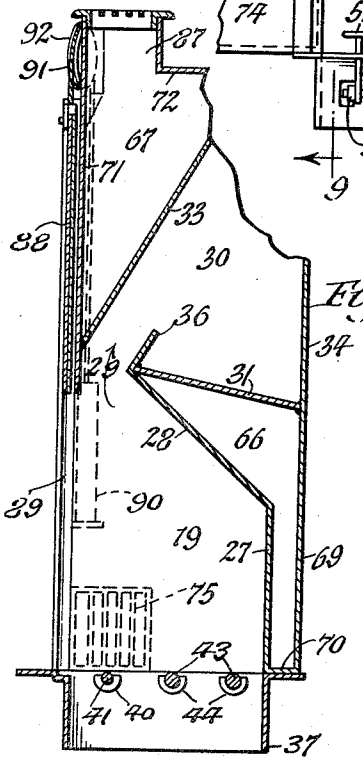
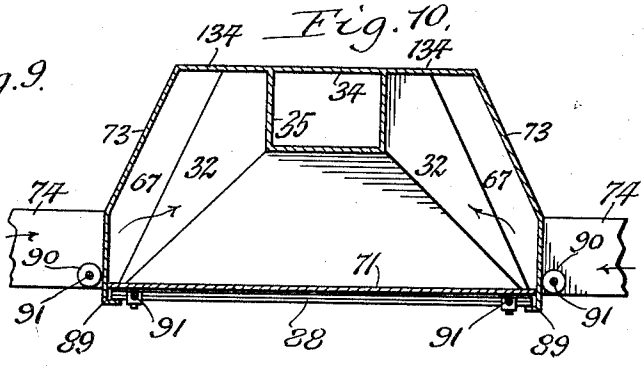


Fig. 10.



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UNITED STATES PATENT OFFICE

2,223,763

FIREPLACE CONSTRUCTION

Max L. Heinz, Buffalo, N. Y.

Application November 14, 1939, Serial No. 304,338

1 Claim. (Cl. 126—120)

This invention relates to a fireplace for buildings which is of the type having auxiliary air ducts arranged adjacent to the hearth so that heating of the room is effected partly by the direct conducting effect of the fire on the air in the room and partly by the indirect radiation effect of the heat of this fire on flues through which the air passes.

The objects of this invention are to provide a fireplace of this character which will heat air taken from the room containing the fireplace and from the exterior of the building, or from either of these sources, and which is more efficient in its heating effect, relatively simple in construction, easily and conveniently operable, and can be manufactured and installed at low cost.

In the accompanying drawings:

Fig. 1 is a front elevation, partly in section, of a fireplace embodying one form of this invention.

Figs. 2 and 3 are horizontal sections taken on the correspondingly numbered lines in Fig. 1.

Fig. 4 is a vertical section taken on line 4—4, Fig. 1.

Fig. 5 is a fragmentary front elevation of the fireplace shown in Fig. 1, but with the screen closed across the front of the fire box.

Fig. 6 is a fragmentary vertical section taken on line 6—6, Fig. 3.

Fig. 7 is a fragmentary vertical section, on an enlarged scale, taken on line 7—7, Fig. 5.

Fig. 8 is a front elevation showing a modification of a fireplace constructed in accordance with this invention.

Fig. 9 is a vertical section taken on line 9—9, Fig. 8.

Fig. 10 is a horizontal section taken on line 10—10, Fig. 8.

In the following description similar characters of reference indicate like parts in the several figures of the drawings.

In Figs. 1–4 the fireplace embodying the present invention is installed in a building having a floor 20, an upright outer wall 21, a chimney have a lower hollow body 22 which projects forwardly into the room of the building and supports a mantel shelf 23 and a flue 24 extending upwardly from the upper outer part of the body. The body and flue of the fireplace may be constructed of any suitable material but in the drawings the same are represented as being made of bricks, tiles and the like. On its front side the body of the fireplace is provided with a firing opening 25 and at the lower end of this opening is arranged the usual slab 16.

Within the lower part of the body of the fireplace is a fire box 19 which is enclosed by a casing constructed of sheet metal and comprises two upright side walls 26 converging rearwardly from opposite vertical edges of the firing opening 25, an upright back wall 27 arranged in the rear part of the body and connected at its opposite vertical edges with the lower rear part of the side walls and a forwardly inclined deflector 28 arranged in the upper rear part of the body and connected at its side edges with the side walls 26 and also connected at its rear edge with the upper edge of the back wall while its front edge is separated from the upper front part of the body above its fire opening 25 by a transverse throat 29.

Within the upper rear part of the hollow body 22 is arranged an upwardly tapering smoke box or gathering chamber 30 which is enclosed by a casing constructed of sheet metal and comprises a substantially horizontal smoke shelf 31 connected at its front end with the upper end of the deflector 28 and extending rearwardly therefrom, two upwardly converging side walls 32 connected at their lower ends with opposite side edges of the smoke shelf 31, a rearwardly inclined front wall 33 extending upwardly from the front side of the throat 29 adjacent to the top of the fire opening 25 and connected at its opposite upright edges with the front edges of the inclined side walls 32, and an upright rear wall 34 connected with its opposite vertical edges to the rear edges of the inclined side walls 32 while its lower edge is connected with the rear edge of the smoke shelf 31.

The upper ends of the side, front and rear walls of the gathering chamber are in line and are connected with the lower end of a contracted outlet neck 35 of sheet metal which communicates at its upper end with the lower end of the chimney flue 24 and is connected therewith in any suitable manner. The lower front parts of the inclined side walls 32 of the gathering chamber 30 connect with the upper front parts of the side walls 26 of the fire box 19 and the throat 29 forms a passage for connecting the upper front part of the fire box with the lower front part of the gathering chamber.

Upon burning fuel on the hearth arranged at the bottom of the fire box the flame and smoke upon rising are directed forwardly by the deflector wall 28 toward the throat 29, thence pass through the latter into the lower front part of the gathering chamber 30, thence upwardly and rearwardly in the gathering chamber to the outlet neck 35, and thence upwardly through the latter to the flue 24 which latter delivers the same to the outer atmosphere. Any down draft from the flue upon

entering the gathering chamber will strike the bottom 31 thereof and be turned upwardly by a baffle 36 which inclines upwardly and rearwardly from the upper edge of the deflector 28 and the front edge of the bottom 31, thereby preventing any down draft from blowing smoke downwardly through the throat 29 into the fire box and room and interfering with the fire or blowing smoke into the room.

In its preferred form the hearth for supporting the fuel on the bottom of the fire box is constructed as follows:

The numeral 37 represents a grate frame of metal projecting downwardly from the lower end of the fire box in rear of the slab 16 and into an ash pit or chute 38 formed in the adjacent part of the chimney body. Across the upper front part of this grate frame is arranged a hearth dump plate 39 which is capable of rotation about a horizontal transverse axis and movable either into a horizontal operative position in which it is in the same plane as the slab 16, as shown in Fig. 4, or it can be shifted into a rearwardly inclined position for discharging any ashes lying on the same into the ash pit or chute 38. Various means may be employed for pivotally mounting the dump plate, those shown in the drawings comprising bearings 40 preferably struck out of the metal on the adjacent part of the grate frame and trunnions 41 arranged at opposite ends of the dump plate and journaled in said bearings. Tipping of the dump plate is effected by pressing its rear edge downwardly and upon releasing the same it returns automatically to its normal position, this being effected by arranging the trunnions 41 rearwardly of the center of the dump plate which causes that part in front of the axis of rotation to be wider than the rear part of the same in rear of this axis, whereby the weight of the front part of the dump plate predominates and automatically restores this plate to its normal position when released. The movement of the dump plate is arrested upon reaching the normal position by engaging the front edge of the dump plate with a stop 17 on the adjacent front part of the grate frame, as shown in Fig. 4.

In rear of the dump plate is arranged the grate of the hearth which preferably comprises two toothed grate bars 42 which are pivotally mounted so that the same can be moved into a normal operative position in which they are both in the same plane as the hearth slab and the dump plate, as shown in Fig. 4, or the same can be rocked and inclined so as to discharge the ashes thereon into the ash pit. For this purpose the opposite ends of the grate bars are provided with transverse trunnions 43 which are journaled in bearings 44 struck out or otherwise formed on the adjacent side parts of the grate frame. Turning or rocking of the grate bars into and out of their operative position may be effected in any suitable manner but preferably by the means shown in Figs. 1, 2 and 4, and comprising a transverse shaft 45 journaled in bearings 46 on the front part of the grate frame, a rear rock arm 47 projecting upwardly from one end of this rock shaft and connected by a shifting bar 48 with arms 49 projecting downwardly from the grate bars, and a front rock arm 50 projecting forwardly from the opposite end of this rock shaft through an opening in the grate frame and connected with the lower end of a vertical operating rod 51 which extends through the slab 16 and grate frame and is provided above the latter with a handle 52 whereby the grate bars may be shaken manually.

Protecting means are provided whereby the front side of the fire box may be covered and uncovered depending on the conditions under which the fireplace is used. In the form shown in Figs. 1, 2, 4, 5 and 7 these protecting means comprise two screen sections which are slidable horizontally into and out of pockets 53 formed between the front parts of the chimney body and the fire box on horizontally opposite sides of the firing opening 25. Each of these sections is of such dimensions that upon withdrawing the same from its pocket it covers one-half of the firing opening and abuts with its front vertical edge against the corresponding edge of the other screen section at the vertical center of the firing opening, thereby completely covering the latter, as shown in Fig. 5. Each of the pockets is of such length that upon separating the screen sections the fullest extent each section will be entirely concealed except the front edge thereof and thus uncover practically the entire area of the firing opening, as shown in Figs. 1 and 2.

Each of the screen sections is provided on its front edge with a handle 54 for manipulating the same. In the preferred construction each of these screen sections comprises two panels 55 which are secured together by screws 56 or the like and provided with registering window openings 57 and transparent panes 58 of mica or other fire resistant material extending across these window openings and clamped between these frames, as shown in Figs. 5 and 6. When an open fire is desired the sections of the screen are pushed sidewise into the pockets of the chimney body and when it is desired to cover the firing opening for safety upon leaving the same unattended or to avoid accidents to children or for other reasons, then the screen sections are drawn out of these pockets and engaged with each other at their front ends, thereby covering the front side of the firing opening and guarding against possible accidents. While the screens are thus drawn together into their operative position, the flames of the fire are still visible thereby not only rendering the same interesting but also enabling the attendant to observe the condition of the fire on the hearth and take care of the same when necessary.

To permit of supplying air to the fire on the hearth when the screen is closed and thus maintain proper combustion an air control device is provided which preferably comprises a plurality of air openings 59 arranged in a horizontal row in the lower part of one panel of each screen section, and a shutter 60 slidable horizontally on the other panel of this screen section and provided with openings 61 adapted to register more or less with the openings 59 according to the amount of air required by the fire, this shutter being actuated manually by a handle 62 projecting forwardly from the shutter, as shown in Figs. 5 and 7.

For the purpose of regulating the draft from the fire box through the chimney to suit different conditions, means are provided which preferably consist of a vertically rotatable damper 63 arranged in the neck 35 of the gathering chamber 30 and adapted to shut off the flue of the chimney more or less or completely close the same. This damper is mounted on a horizontal operating shaft 64 which is journaled in the upper part of the chimney body and the neck 35 and extends through the latter and is provided in

front of the chimney body with a handle 65 for manipulating the same.

In order to heat the air in the room more rapidly and economically means are provided including a heating chamber which is arranged around parts of the fire box and gathering chamber and through which air from the room is circulated so as to be heated indirectly by radiation from the heated walls of the fire box and gathering chamber. The lower section 66 of this heating chamber is formed between the rear and side of the walls of the fire box and a lower jacket section and the upper section 67 of the heating chamber is formed between the front and side walls of the gathering chamber and an upper jacket section, which jackets are constructed of sheet metal. The lower jacket section comprises two upright side walls 68 which are spaced from the side walls 26 of the fire box, an upright rear wall 69 connecting the rear ends of the side walls 68 and spaced from the rear wall 27, a bottom 70 connecting the lower ends of the respective side walls 26 and rear walls 27 of the fire box and side and rear walls 68, 69 of the lower heating chamber section. The upper jacket section comprises an upright front wall 71 which is connected at its lower edge with the lower end of the front wall 33 of the gathering chamber 30 and has its upper part spaced therefrom, a horizontal top wall 72 connected at its front edge with the upper edge of the front wall 71 while its rear edge is connected with lateral extensions 134 of the rear wall 34 and the neck 35, and two rearwardly converging upright side walls 73 spaced from the side walls 32 of the gathering chamber 30 and each connected at its vertical front edge with the front wall 71, at its rear edge with one of the rear wall extensions 134, and at its upper edge with the top wall 72. It will be noted that the opposite side parts of the lower and upper sections of the heating chamber communicate with each other on horizontal opposite edges of the wall 31 which constitutes the bottom of the gathering chamber 30 and the top of the lower section 66 of the air heating chamber.

In the construction shown in Figs. 1–4, cold air inlet ducts 74 are arranged horizontally in the lower part of the chimney body, each of these ducts communicating at its inner end with the lower front part of one side of the lower heating chamber section and having its inlet end arranged flush with the adjacent side of the chimney body and provided with a grill 75. In the upper part of the chimney body are arranged two horizontal warm or hot air outlet ducts 76 each of which communicates with the upper front part of one side of the upper air heating chamber while its outer or inlet end terminates flush with the respective side of the chimney body and is provided with a grill 77.

By these means air is conducted from the lower or floor part of the room through the air inlet ducts 74 into the lower section of the heating chamber, thence upwardly in the latter around the opposite lateral and rear sides of the fire box, thence upwardly through the upper heating chamber section and around the front and lateral sides of the gathering chamber, and thence through the outlet ducts into the upper part of the room, thereby circulating the air in contact with the walls of the fire box and gathering chamber and heating the same indirectly from the flames and hot gases in the fire box and gathering chamber in addition to heating the air directly by the fire in the fire box, whereby a greater volume of air is heated for a given consumption of fuel.

If it is desired to admit fresh air to the fireplace from the outside of the building this is accomplished by opening a fresh air intake 78 which extends through the lower rear part of the chimney body from the exterior of the building to the lower rear part of the lower heating chamber section 66. This fresh air intake is provided at its outer end with a grill 79 and the same may be closed or opened more or less by a vertically movable shutter 80 which slides in guides 81 on the rear side of the lower jacket section. Raising and lowering of the shutter may be effected by a horizontal shaft 82 journaled lengthwise in the upper part of the chimney body and the adjacent side part of the upper jacket section and provided at its rear end with a crank arm 83 and at its front end with a handle 84 which can be manipulated in front of the chimney body, an intermediate vertically swinging rock lever 85 pivoted on the wall 134 and having one of its arms connected with the rear arm 83 of the rock shaft, and an upright shifting rod 86 connected at its upper end with the other arm of the rock lever while its lower end is connected with said fresh air controlling shutter 80.

Instead of discharging the heated air horizontally from the upper part of the upper heating chamber section the air after being heated indirectly by the fire in the fire box and gathering chamber may be discharged vertically therefrom by means of upright air outlet ducts 87 extending upwardly from the opposite upper parts of the upper heating chamber section, as shown in Figs. 8 and 9. In this modified construction a screen is also shown which comprises a panel 88 movable vertically in front of the firing opening of the fire box and guided at its opposite vertical edges in upright guideways or rails 89 on the fire box and means for balancing this screen comprising counterweights 90 arranged on opposite sides of the fire box and each connected with one of the upper corners of the screen by a flexible line 91 passing over a guide roller 92 mounted on the adjacent upper stationary part of the fireplace, as shown in Figs. 8, 9 and 10.

I claim as my invention:

A fireplace comprising a chimney body, a fire box arranged in the lower part of said body, a gathering chamber arranged in the upper part of said body and communicating at its lower end with the top of said fire box, a flue communicating with the top of said gathering chamber, an air heating chamber having a lower section arranged around the fire box and provided on its lower front part with an internal air inlet and on its lower rear part with an external air inlet and an upper section communicating with the lower section and arranged around said gathering chamber and having an upper air outlet, a vertically movable damper for controlling said external air inlet, and means for actuating said damper including a horizontal rock shaft journaled in said body and provided at its rear end with a rock arm and at its front end with an operating handle, an intermediate lever pivoted on a fixed support and having one end connected with the rock arm of said rock shaft, and a shifting rod connecting the other end of said lever with said damper.

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